



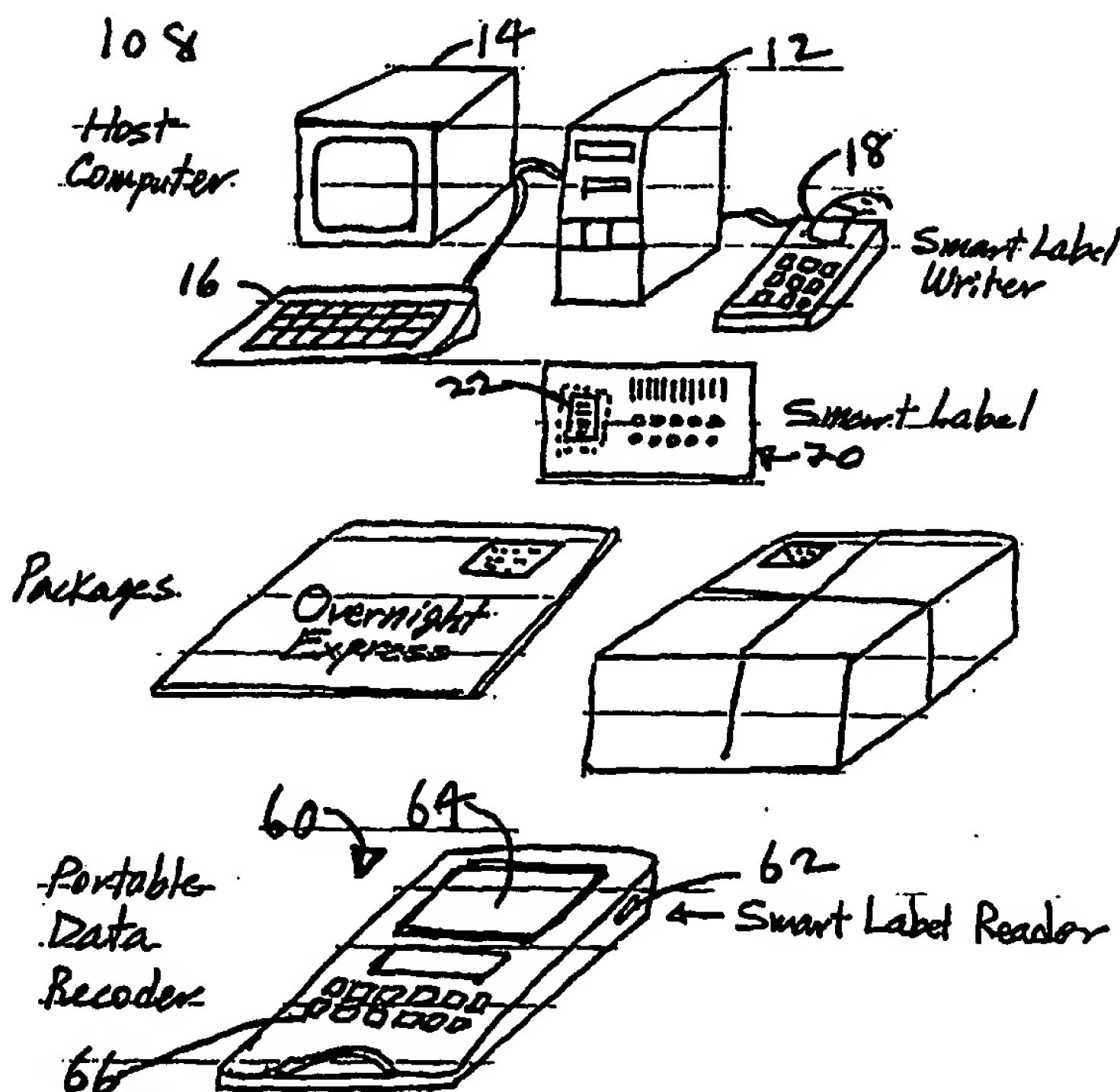
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B07C 3/12, 3/00	A1	(11) International Publication Number: WO 99/06161 (43) International Publication Date: 11 February 1999 (11.02.99)
<p>(21) International Application Number: PCT/US98/15574</p> <p>(22) International Filing Date: 27 July 1998 (27.07.98)</p> <p>(30) Priority Data: 08/904,891 1 August 1997 (01.08.97) US</p> <p>(71)(72) Applicants and Inventors: KATO, Kiroku [US/US]; 3611 Oakes Drive, Hayward, CA 94542 (US). PHAM, Thiet [US/US]; 2682 Glen Hardy Court, San Jose, CA 95148 (US).</p> <p>(74) Agents: HSUE, James, S. et al.; Majestic, Parsons, Siebert & Hsue P.C., Suite 1100, Four Embarcadero Center, San Francisco, CA 94111 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. With amended claims.</p>	

(54) Title: IMPROVED PACKAGE AND MAIL DELIVERY SYSTEM

(57) Abstract

At the shipping department of a company, contracted outlets or outlets of delivery companies, information concerning the shipper and receiver are written into a label having a memory, but no controller or energy source. The label has a transmitter and the label makes use of power supplied by RF query signals to fetch the information stored and transmits such information to a label reader located either in a portable recorder or at sorting locations. After the information is written into the label, the label is attached to the package. Upon being picked up, the label on the package is read by a portable recorder which transmits the information to a main computer. The packages are then delivered to local hubs of the receiving outlets where information in the labels of the packages are read and the packages sorted according to the information in the labels on the packages and the packages are then delivered to either a central hub and/or local distribution centers of the destinations, where the labels of the packages are then read and the packages sorted accordingly for ultimate delivery to the receiver. Tracking numbers and other delivery information may be retrieved at any point along the way either by portable recorder or at the sorting centers and transmitted to the main computer for tracking and response to inquiries.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

IMPROVED PACKAGE AND MAIL DELIVERY SYSTEM**BACKGROUND OF THE INVENTION**

This invention relates in general to delivery systems and in particular to an improved package and
5 mail delivery system.

In a conventional package delivery system, packages including parcels and envelopes are delivered in the following manner. The shipper of the parcel or envelope is identified and the shipper's name, telephone number
10 and address as well as the receiver's name, telephone number and address are recorded on a delivery form. The delivery type, tracking number and other remarks such as COD and other special instructions are also recorded on the delivery form. After the above-noted information
15 has been recorded on the delivery form, the form is placed onto or attached to each package. Some delivery forms have pre-printed barcodes, or a separate barcode label may be printed and placed onto or attached to the package. The barcodes may be used as tracking numbers
20 also.

In a conventional package delivery system, packages are picked up by delivery companies from locations where the above-noted information is input into a computer for purposes such as invoicing and tracing. Tracking
25 numbers on the delivery forms or on the separate barcode labels are read by a barcode scanner and transmitted to the central computer center for customer service, so that information of the whereabouts of the packages can be provided in response to customer inquiry. The

packages are typically sorted manually by having a person read the receiver's address on the delivery form of each package. After the packages have been sorted they are delivered by train, truck or plane, depending
5 on the type of delivery specified on the delivery form, to the destination. On its way, the package may need to be sorted repeatedly by hand at different locations in a similar manner before it is delivered to the specified destination. During each step of the delivery process,
10 the tracking number of each package may be read by a barcode scanner and transmitted to the central computer center.

The above-described conventional package delivery system is expensive and prone to errors. Since the
15 sorting is done manually, a large number of people would have to be hired to sort the packages by means of the information entered on the delivery forms.

In view of the above disadvantages, alternatives have been proposed. In U.S. Patent No. 5,153,842 for
20 example, an integrated circuit package label and/or manifest system is proposed by Dlugos, Sr. et al. In this system, a battery or solar cell powered integrated circuit package label is attached to each package, where each label is used to store delivery information. After
25 the package has been delivered, the label is detached and returned to the carrier, where some or all of the information in the label is read by a terminal and uploaded to a host computer for billing and analysis. The label is then reused.

30 While the proposed integrated circuit patched label of Dlugos, Sr. et al. described above is an improvement over the conventional system, the labels proposed by Dlugos, Sr. et al. are expensive since each of such labels requires a microprocessor and a battery or solar
35 cell for powering the label. It is, therefore,

desirable to provide a simpler design for the package delivery system which is simpler and inexpensive.

SUMMARY OF THE INVENTION

A first aspect of the invention is directed towards
5 a method for tracking items in a package delivery system
comprising writing into a plurality of storage labels,
each of the labels associated with an item to be
delivered, information concerning delivery of the items,
said information useful for automated sorting and
10 tracking the items along their passage to destinations;
transporting the items and their associated labels;
applying query signals to the labels to retrieve the
information and causing said labels to provide said
information by means of energy of the query signals
15 received by the labels. The method further comprises
sorting the items by means of the information retrieved
and delivering the sorted items to destinations.

Another aspect of the invention is directed towards
a system for tracking items in package delivery
20 comprising a plurality of storage labels; means for
writing into each of said plurality of storage labels,
information concerning delivery of an associated item,
said information useful for automated sorting and
tracking the items along their passage to destinations;
25 means for transporting the items and their associated
labels and means for applying query signals to the
labels to retrieve the information, said labels
providing said information by means of energy of the
query signals received by the labels. The system
30 further comprises means for sorting the items by means
of the information retrieved and means for delivering
the sorted items to destinations.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1A is a perspective view of a host computer system with a label writer to illustrate the invention.

Fig. 1B is a front view of a label useful for
5 illustrating the invention.

Figs. 1C and 1D are perspective views of different types of packages that may be shipped using the system and method of this invention.

Fig. 1E is a perspective view of a label reader
10 useful for illustrating the invention.

Fig. 2 is a schematic diagram of the various points in the dispersion chain of packages where the host computer, the label writer and/or the label reader of Figs. 1A, 1B and 1E may be used for writing labels for
15 attachment to packages, and tracking and sorting the packages to illustrate the invention.

Fig. 3 is a flow chart illustrating a preferred method of the invention.

Fig. 4 is a schematic view of a sorting subsystem
20 useful for illustrating this invention.

For simplicity in description, identical components are identified by the same numerals in this application.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1A is a perspective view of a host computer
25 system with a label writer. Fig. 1B is a front view of a label which may be used for storing information about packages so that the packages may be sorted and tracked. The host computer system 10 includes a computer 12, monitor 14, keyboard 16 and a label writer 18. Label
30 writer 18 is adapted for writing information into a label 20 of Fig. 1B, preferably by contact with the label 20. Information such as the name, address of the entity or person sending the package, and the receiver's name/address zip code may be input through the keyboard
35 16 or any other input device to computer 12 which causes

the writer 18 to write such information into label 20. Other information such as tracking number, delivery type and class (special delivery, second day air, ground guaranteed, COD, etc.) and special instructions for delivery may also be recorded in label 20 through the computer system 10 and writer 18 in the same manner. All such information is stored in a memory in label 20. If desired, some or all of the information so stored may also be printed on label 20. Label 20 is a delivery label preferably constructed with an electronic device sandwiched between paper or plastic materials, and the bottom cover of the label has glue with peel-off paper. In this manner, after appropriate information has been input into the label (and printed on the label if desired) the paper is peeled off and the label 20 containing delivery information about a particular package is then glued onto such package, such as a package illustrated in Fig. 1C or 1D.

Information to be written into label 20 may also be conveyed to label writer 18 from sources other than a host computer; such and other implementations are within the scope of the invention.

In reference to Fig. 2, the above-described process using the host computer for writing information into the label 20 (and printing information on the label) may be performed at points such as outlets 52 of the dispersion system 50 in Fig. 2. Outlets 52 may be contracted outlets for receiving packages or the shipping departments of companies, government or other entities. These outlets are equipped with systems such as the computer system 10 of Fig. 1A for inputting the above-described information into label 20. After the appropriate information has been written into the labels and the labels attached to their respective packages, the packages at the outlets 52 are then picked up by one or more delivery companies. The package pick-up person

from the delivery company carries a data recorder 60 of Fig. 1E, where recorder 60 includes a label reader 62. Preferably recorder 60 is portable so that the delivery person may carry it while making deliveries.

5 In reference to Figs. 1E and 2, the label reader 62 reads the information stored in label 20 and stores such information read in a memory in recorder 60. The information read from the label may be displayed on the screen 64 and a keyboard 66 is provided for the package
10 delivery person to input information. Recorder 60 preferably contains a microprocessor for controlling the storage of information from reader 62 and the input of information from a user. Recorder 60 preferably also includes a transmitter whereby information, including
15 information read by reader 62 and that input by the delivery person, may be transmitted to a main computer center 70 through wireless communication, such as through radio frequency signals 72. This is illustrated in Fig. 2, where the delivery persons use readers 62 to
20 read the labels on the packages they are delivering and use the recorders 60 to send such and other information to center 70 through signals 72 while such persons are on route between the outlets 52 and hubs 80.

Label reader 62, which may be battery powered,
25 transmits a query signal to label 20 for reading the information therein. Label 20 contains a transmitter 22 and a memory for storing the information input by label writer 18. In the preferred embodiment, label 20 has no controller, processor or microprocessor of any kind, and
30 also has no battery, solar cell or any other kind of energy source. Label 20 has the capability of using the energy of the query signal from label reader 62 or other sources for fetching the information stored in its memory and transmitting the information so fetched by
35 transmitter 22 to the label reader 62. Label 20 may comprise an integrated circuit with memory, an antenna

in the form of a coil, so that information may be recorded in the memory, fetched in response to query signals without its own energy source and transmitted by means of the coil. Labels of this type may be ordered
5 with the above specifications from a number of semiconductor chip manufacturers, such as Indala, Inc. of San Jose, California.

In one embodiment, label reader 62 sends radio frequency query signals to label 20 and label 20
10 responds by transmitting radio frequency (RF) signals containing the information stored in label 20 to reader 62, using the energy of the query signals from reader 62. The label reader 62 contains a transceiver which transmits the query signals and receives information
15 from the label 20 through wireless communication such as RF signals. Obviously, other types of wireless communication other than radio frequency signals may be used and are within the scope of the invention.

The delivery person delivers the packages
20 preferably to a local hub 80 of the delivery company, where the labels on the packages are read and the packages sorted in accordance with the information stored in the attached labels; for example, the packages may be sorted in accordance with delivery
25 classification, zip codes, cities, delivery class and so on. The sorting process is described in detail below in reference to Fig. 4. The reading of the information from the labels may be accomplished by a smart label reader 62 at the local hubs 80. The label reader 62
30 used may be part of the portable data recorder 60 used at the local hubs; alternatively, the label reader 62 may be stand alone devices stationed at such local hubs.

After the packages have been sorted at hubs 80, they are then delivered either to a central sorting hub
35 100 or directly to one or more local distribution centers 110 of the destination of the packages as shown

in Fig. 2. At the central sorting hub and/or the distribution center 110, the packages are then again read by means of label reader 62 and sorted according to the information read. If the packages are delivered to a central sorting hub, they are then delivered to local distribution centers for corresponding destinations of the packages. At the local distribution centers, the packages are then loaded to a package delivery vehicle and delivered to the receivers or addressees 120 of the packages according to the name and address information stored in the labels. The tracking numbers and other delivery information of the packages can be read by the label reader 62 at any point between the outlets 52 and the receivers 120 by means of the label reader in a portable data recorder 60 carried by a delivery person at any delivery route between outlets 52 and receivers 120 and can be read by label readers 62 at the local hubs 80, the central hub 100 or the distribution center 110. Such information may be transmitted to the main computer center 70 at any time on route between outlet and receiver 120, to enable the packages to be tracked and traced if necessary.

The process of this invention is now illustrated in reference to Fig. 3. At the receiving outlets 52, information described above concerning the shipper and the receiver or addressee 120 is written into the labels 20 and the labels are then attached to the packages (block 200). The labels are then read by the portable data recorder of the delivery person from a delivery company and the information so read are then transmitted to the main computer center (block 202). The packages are then delivered to the corresponding local hub of the outlets, where information in the labels are again read by a portable data recorder or a stand alone label reader. Again, the information may be transmitted to the main computer center if desired for purposes of

confirmation and tracking (block 204). After the labels on the packages are being read and the packages sorted using the information read (block 204), the packages are then delivered either directly to the local distribution centers 110 of the destinations or to a central hub 100 (block 206). In some situations, it may be desirable to deliver some of the packages to a central hub and other packages directly to a local distribution centers of the destinations. At the central hub and/or distribution centers, the labels on the packages are again read by means of the portable data recorders or stand alone label readers as described above (block 206), and the packages are sorted by reference to the information that has been read from the labels on such packages. If the packages are delivered to a central hub, then the packages will need to be delivered to local distribution centers of the destinations where information in the labels are again read so that the packages can again be sorted in an optional step (block 208). After the packages are sorted at the local distribution centers (blocks 206 and/or 208), the packages are then delivered from the distribution centers to the receivers or addressees at their destinations (block 210).

Fig. 4 is a schematic view of a subsystem for sorting packages or delivery items in accordance with this invention. As shown in Fig. 4, the sorting subsystem comprises two stages, each stage including a conveyor belt and associated label readers and gates. The first stage includes conveyor belt 302(1) for conveying the packages or delivery items 5 with labels that are used to store delivery information and attached to the items in the manner described above. Along side of the conveyor belt 302(1) is provided a row of n label readers 304(1), 304(2), ...304(n) collectively referred to as readers 304 and two sets of gates: n gates 306(1), 306(2)....., 306(n) collectively referred to as gates

306, where n is a positive integer, and n gates 308(1), 308(2)...., 308(n) collectively referred to as gates 308, where n is a positive integer. Label readers 304 are controlled by a host computer 310 which sends
5 sorting instructions to the label readers 304.

Subsystem 300 also has a second stage comprising conveyor belt 302(2) and associated label readers 334(1), 334(2), ..., 334(n) collectively referred to as readers 334 and two sets of gates: n gates 336(1),
10 336(2), ..., 336(n) collectively referred to as gates 336, and n gates 338(1), 338(2), ..., 338(n) collectively referred to as gates 338, and receive items 5 from the first stage from paths 320(1), 320(2)...., 320(n) collectively referred to as paths 320.

15 The label readers in the first stage may, for example, receive instructions from the host computer 310 to sort the packages or items according to the delivery instruction classifications, such as overnight air, second day air and ground delivery. Thus, the first
20 label reader 304(1) of the first stage may be instructed by the host computer to select all items that should be delivered by overnight air delivery, and the second label reader 304(2) may be instructed to select all items to be delivered by second day air delivery, and a
25 third label reader 304(3) may be instructed to select all items to be delivered by ground delivery, for example. When label 304(1) reads the label of a package that passes it on the conveyor belt 302(1) and finds information in the label indicating overnight air
30 delivery, label 304(1) would cause gate 306(1) (through a gate control forming a part of the gate) to close and gate 308(1) to open, so that the item so selected will be prevented from travelling any further along belt 302(1) but instead travel through gate 308(1) through a
35 path 320(1) to conveyor belt 302(2). If label reader 304(1), upon reading the information in the label of an

item passing by that such item is to be delivered other than by overnight air delivery, label reader 304(1) will not cause gate 306(1) to close or gate 308(1) to open, so that such item will be transported by conveyor belt 302(1) to label reader 304(2). Label reader 304(2) will then read the information on the label of the item to find out if such item should be delivered by second day air delivery. If the information so indicates, label reader 304(2) will then cause gate 306(2) to close and gate 308(2) to open, causing the package to stop travelling on belt 302(1) and travel down path 320(2) to belt 302(2).

The second stage of subsystem 300 comprises conveyor belt 302(2) and the associated label readers 334, gates 336 and 338 which operate in a manner substantially similar to that of the first stage, but with label readers 334 comprising readers 334(1), 334(2)...., which are instructed by host computer 310 to sort by a different criteria than the first stage, such as by zip code. Thus, the first label reader 334(1) may be instructed to pick up or select items whose addresses have zip codes starting with a zero, the second label reader 334(2) may be instructed to pick up or select items with addresses whose zip code starts with one and so on. Paths 320(1), 320(2),...., 320(n) may simply be chutes where the items will simply slide along an inclined trough from the first stage to the second stage.

After sorting by the second stage, the packages or items 5 may slide down another set of chutes 340(1), 340(2),....,340(n) to respective loading docks 350(1), 350(2),...., 350(n) at which the packages or items 5 are loaded onto delivery trucks for delivery. Obviously, additional sorting stages may be included between the second stage and the loading docks, whereby the host computer will instruct label readers of such stage to

further sort the delivery items, such as by city and neighborhood before the packages reach the loading docks. The host computer 310 collects information such as the number of items at each loading dock from the label readers and matches such information with the original information for further analysis.

The sorting can also be done by first sorting by country or state, followed by delivery classifications such as overnight air, second day air or ground, then by zip codes or other special instructions.

The above-described sorting system using label 20 enables fast and accurate sorting despite the size of the items. In conventional sorting using a barcode scanner, the scanner may need to re-focus to read the barcode attached to each item whenever the distances between the scanner and the barcode labels on the items change due to the different sizes of the items. Such re-focusing not only slows down the sorting process, but increases chances of mis-sorting. Furthermore, in order for the barcode scanner to read the barcode on the item, the item has to be oriented so that the label faces the scanner. This is not necessary when label 20 is read in the manner described above, so that the package 5 can be at any orientation with respect to the label reader.

While the invention has been described above by reference to various embodiments, it will be understood that different changes and modifications may be made

without departing from the scope of the invention which is to be defined only by the appended claims and their equivalents.

WHAT IS CLAIMED IS:

1. A method for tracking items in a package delivery system, comprising:

5 writing into a plurality of storage labels, each of the labels associated with an item, information concerning delivery of the items, said information useful for automated sorting and tracking the items along their passage to destinations;

10 transporting the items and their associated labels;

applying query signals to the labels to retrieve the information and to cause said labels to provide said information by means of energy of the query signals received by the labels;

15 sorting the items by means of the information retrieved; and

delivering the sorted items to destinations.

2. The method of claim 1, said labels having transmitters, said query signals causing the labels to
20 transmit said information by means of the transmitters.

3. The method of claim 1, said applying step applying the signals by means of wireless communication.

4. The method of claim 1, said system having a plurality of local collection outlets, said writing
25 step being performed at the outlets.

5. The method of claim 4, said system having a plurality of local collection hubs, each hub for collecting packages from a corresponding number of outlets, said transporting step transporting the items
30 from said corresponding number of outlets to each of said hubs, said applying step applying the signals at

the hubs, and said sorting step sorting the items at each of the hubs.

5 6. The method of claim 5, said transporting step transporting the items from one or more local hubs to a plurality of distribution centers or a central sorting hub, said applying and causing steps applying the signals to the items and causing the labels to provide said information at the centers or the central sorting hub, said sorting step sorting the items at the
10 centers or the central sorting hub.

7. The method of claim 1, said writing step writing information related to name, address, telephone number or zip code related to destinations, or tracking number or special delivery instructions.

15 8. The method of claim 1, further comprising sending the information retrieved to a central computer for tracking the items.

20 9. The method of claim 1, wherein said writing step includes contacting the labels by a label writer.

10. The method of claim 1, further comprising attaching the labels to their associated items after the writing step.

25 11. A system for tracking items in package delivery comprising:
 a plurality of storage labels;
 means for writing into each of said plurality of storage labels, information concerning delivery of an associated item, said information useful for automated

sorting and tracking the items along their passage to destinations;

means for transporting the items with their associated labels;

5 means for applying query signals to the labels to retrieve the information, said labels providing said information by means of energy of the query signals received by the labels;

10 means for sorting the items by means of the information retrieved; and

means for delivering the sorted items to destinations.

12. The system of claim 11, said labels having transmitters for providing said information, said
15 transmitters being powered by energy of the query signals.

13. The system of claim 11, said writing means including a reader/writer and a host computer.

14. The system of claim 11, said applying
20 means including one or more portable data readers each of which includes a transceiver that transmits the query signals and receives said information from the labels through wireless communication.

15. The system of claim 11, further
25 comprising a plurality of local collection outlets, said writing means being located at the outlets.

16. The system of claim 15, said system having a plurality of local collection hubs, each hub for collection packages from a corresponding number of
30 outlets, said transporting means transporting the items from said corresponding number of outlets to each of

17

said hubs, said applying means applying the signals at the hubs, and said sorting means sorting the items at each of the hubs.

5 17. The system of claim 11, further comprising a plurality of local hubs, said transporting means transporting the items to the hubs, said applying and causing means applying the query signals and receiving said information provided by the labels at the hubs.

10 18. The system of claim 17, said sorting means sorting the items at the hubs using the retrieved information.

15 19. The system of claim 11, further comprising a plurality of distribution centers and/or a central hub, said transporting means transporting the items from the hubs to the centers and/or the central hub, said applying means applying the query signals and receiving said information provided by the labels at the centers and/or the central hub.

20 20. The system of claim 11, wherein said labels include no energy source, or controller or microprocessor and are suitable for attachment to the items.

AMENDED CLAIMS

[received by the International Bureau on 17 December 1998 (17.12.98);
original claims 1, 11 and 19 amended; original claims 2 and 12 cancelled;
new claims 21-28 added; remaining claims unchanged (6 pages)]

1. A method for tracking items in a package
delivery system, comprising:

5 writing into a plurality of storage labels,
said labels having transmitters, each of the labels
associated with an item, information concerning delivery
of the items, said information useful for automated
sorting and tracking the items along their passage to
destinations;

10 transporting the items and their associated
labels;

applying query signals to the labels to
retrieve the information and to cause said labels to
provide said information through their transmitters,
15 wherein said transmitters are caused to be powered by
means of energy of the query signals received by the
labels in transmitting said information;

sorting the items by means of the information
retrieved; and

20 delivering the sorted items to destinations.

2. Cancelled.

3. The method of claim 1, said applying step
applying the signals by means of wireless communication.

4. The method of claim 1, said system having
25 a plurality of local collection outlets, said writing
step being performed at the outlets.

5. The method of claim 4, said system having
a plurality of local collection hubs, each hub for
collecting packages from a corresponding number of

outlets, said transporting step transporting the items
from said corresponding number of outlets to each of
said hubs, said applying step applying the signals at
the hubs, and said sorting step sorting the items at
5 each of the hubs.

6. The method of claim 5, said transporting
step transporting the items from one or more local hubs
to a plurality of distribution centers or a central
sorting hub, said applying and causing steps applying
10 the signals to the items and causing the labels to
provide said information at the centers or the central
sorting hub, said sorting step sorting the items at the
centers or the central sorting hub.

7. The method of claim 1, said writing step
15 writing information related to name, address, telephone
number or zip code related to destinations, or tracking
number or special delivery instructions.

8. The method of claim 1, further comprising
20 sending the information retrieved to a central computer
for tracking the items.

9. The method of claim 1, wherein said
writing step includes contacting the labels by a label
writer.

10. The method of claim 1, further comprising
25 attaching the labels to their associated items after the
writing step.

11. A system for tracking items in package
delivery comprising:
a plurality of storage labels, said labels
30 having transmitters;

means for writing into each of said plurality of storage labels, information concerning delivery of an associated item, said information useful for automated sorting and tracking the items along their passage to
5 destinations;

means for transporting the items with their associated labels;

means for applying query signals to the labels to retrieve the information, said labels providing said
10 information through their transmitters, wherein said transmitters are caused to be powered by means of energy of the query signals received by the labels in transmitting said information;

means for sorting the items by means of the
15 information retrieved; and

means for delivering the sorted items to destinations.

12. Cancelled.

13. The system of claim 11, said writing
20 means including a reader/writer and a host computer.

14. The system of claim 11, said applying means including one or more portable data readers each of which includes a transceiver that transmits the query signals and receives said information from the labels
25 through wireless communication.

15. The system of claim 11, further comprising a plurality of local collection outlets, said writing means being located at the outlets.

16. The system of claim 15, said system
30 having a plurality of local collection hubs, each hub for collection packages from a corresponding number of

outlets, said transporting means transporting the items from said corresponding number of outlets to each of said hubs, said applying means applying the signals at the hubs, and said sorting means sorting the items at
5 each of the hubs.

17. The system of claim 11, further comprising a plurality of local hubs, said transporting means transporting the items to the hubs, said applying and causing means applying the query signals and
10 receiving said information provided by the labels at the hubs.

18. The system of claim 17, said sorting means sorting the items at the hubs using the retrieved information.

15 19. The system of claim 11, further comprising a plurality of distribution centers and a central hub, said transporting means transporting the items from the hubs to the centers or the central hub, said applying means applying the query signals and
20 receiving said information provided by the labels at the centers or the central hub.

20. The system of claim 11, wherein said labels include no energy source, or controller or microprocessor and are suitable for attachment to the
25 items.

21. The method of claim 1, wherein said applying causes the transmitters of said labels to transmit said information without using any energy source, controller or microprocessor in or associated
30 with the labels.

22. The system of claim 11, further comprising a plurality of distribution centers, said transporting means transporting the items from the hubs to the centers, said applying means applying the query signals and receiving said information provided by the labels at the centers.

23. A method for tracking items in a package delivery system, comprising:

writing into a plurality of storage labels at one or more receiving outlets, said labels having transmitters, each of the labels associated with an item, information concerning delivery of the items, said information useful for automated sorting and tracking the items along their passage to destinations;

transporting the items and their associated labels to a local distribution center or central hub; applying query signals to the labels to retrieve the information at the local distribution center or central hub and to cause said labels to provide said information through their transmitters, wherein said transmitters are caused to be powered by means of energy of the query signals received by the labels in transmitting said information;

sorting the items by means of the information retrieved; and delivering the sorted items to destinations.

24. The method of claim 23, wherein said transporting transports by means including delivery motor vehicles.

25. The method of claim 23, wherein said delivering delivers by means including delivery motor vehicles.

26. A system for tracking items in package delivery comprising:

a plurality of storage labels, said labels having transmitters;

5 means for writing into each of said plurality of storage labels at one or more receiving outlets, information concerning delivery of an associated item, said information useful for automated sorting and tracking the items along their passage to destinations;

10 means for transporting the items with their associated labels to a local distribution center or central hub;

means for applying query signals to the labels to retrieve the information at the local distribution center or central hub, said labels providing said information through their transmitters, wherein said transmitters are caused to be powered by means of energy of the query signals received by the labels in transmitting said information;

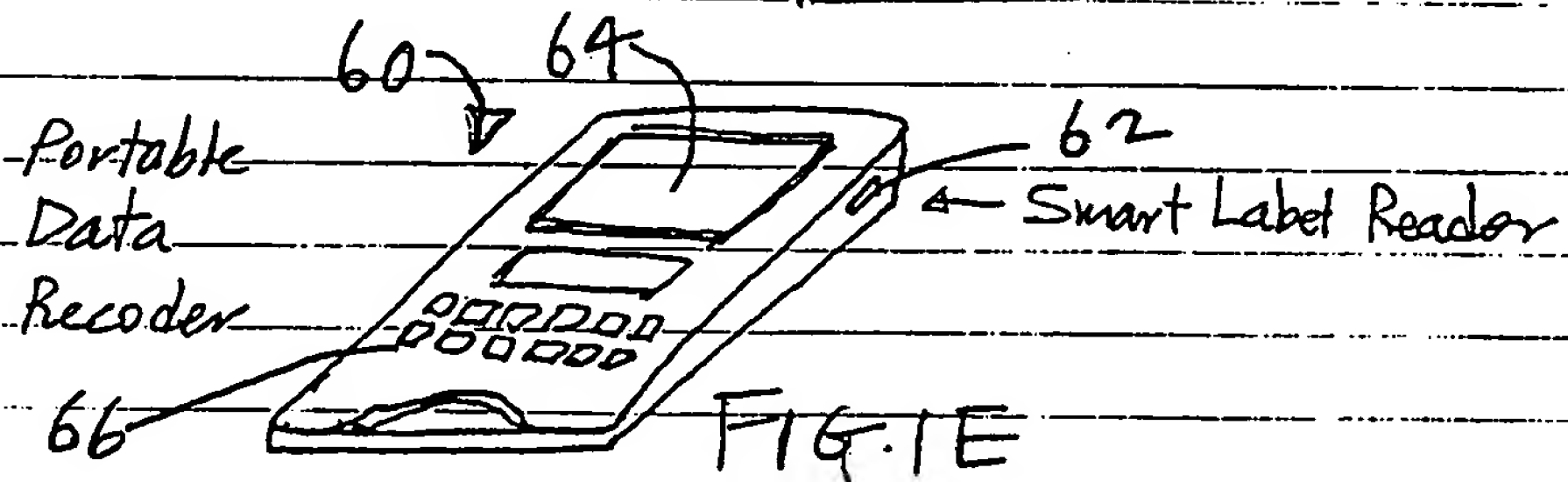
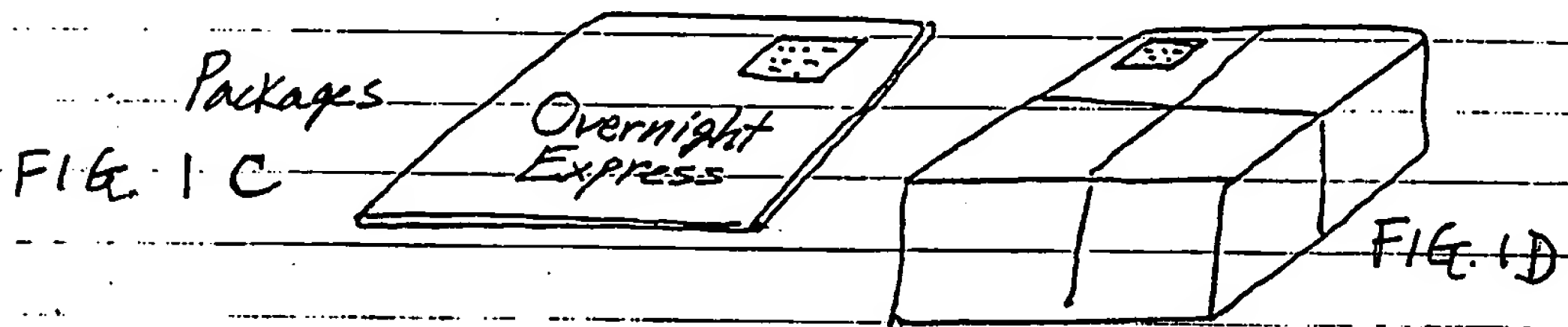
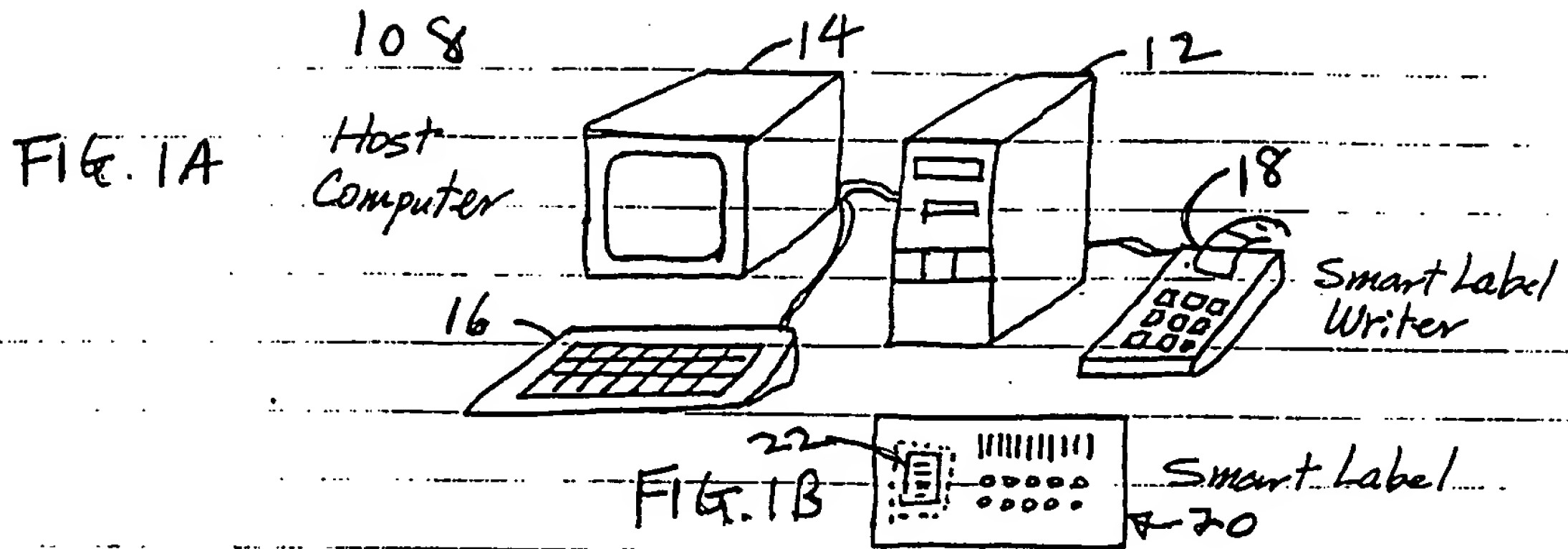
20 means for sorting the items by means of the information retrieved; and

means for delivering the sorted items to destinations.

27. The system of claim 26, wherein said
25 transporting means includes delivery motor vehicles.

28. The system of claim 26, wherein said delivering means includes delivery motor vehicles.

1/4



2 / 4

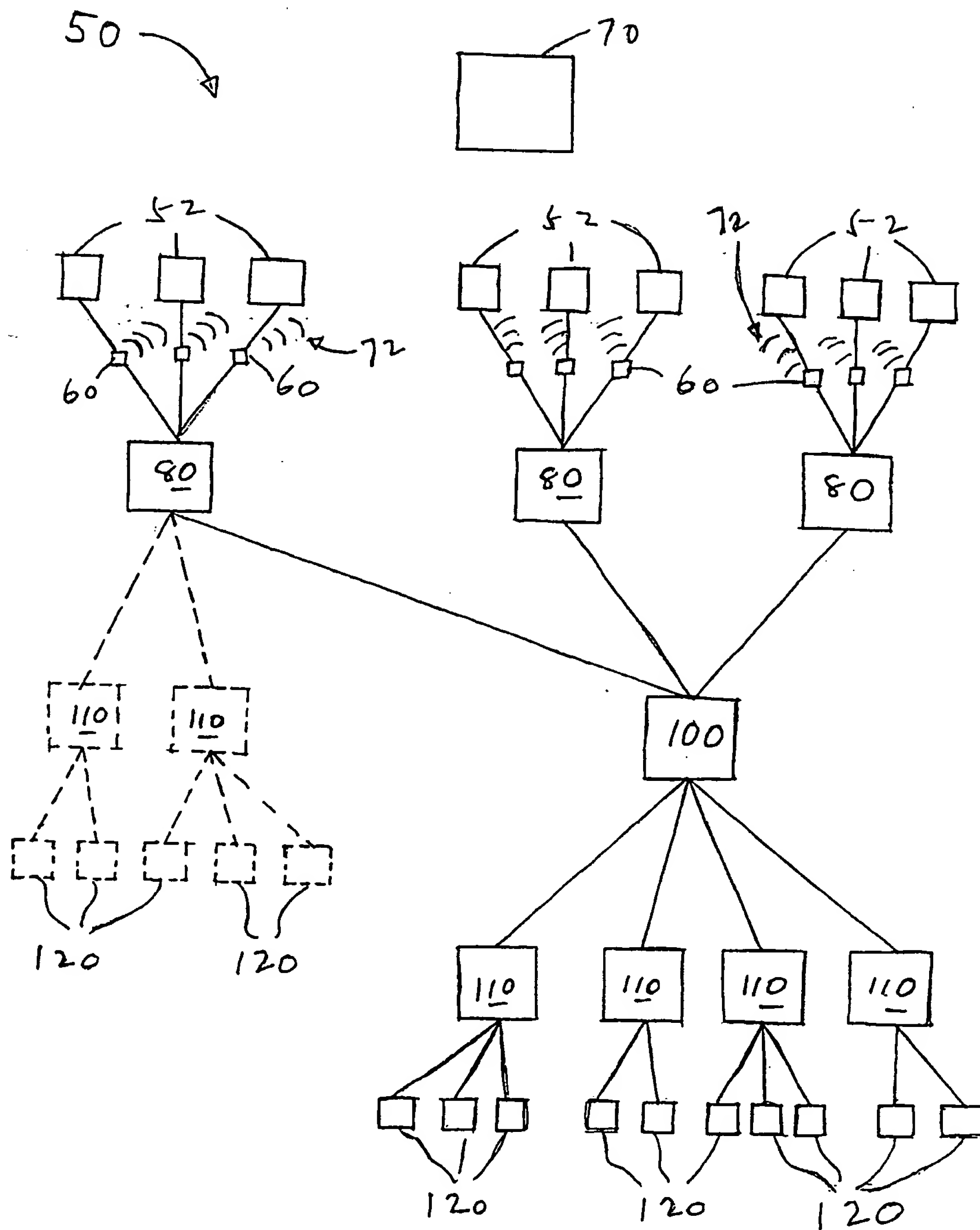


FIG. 2

3/4

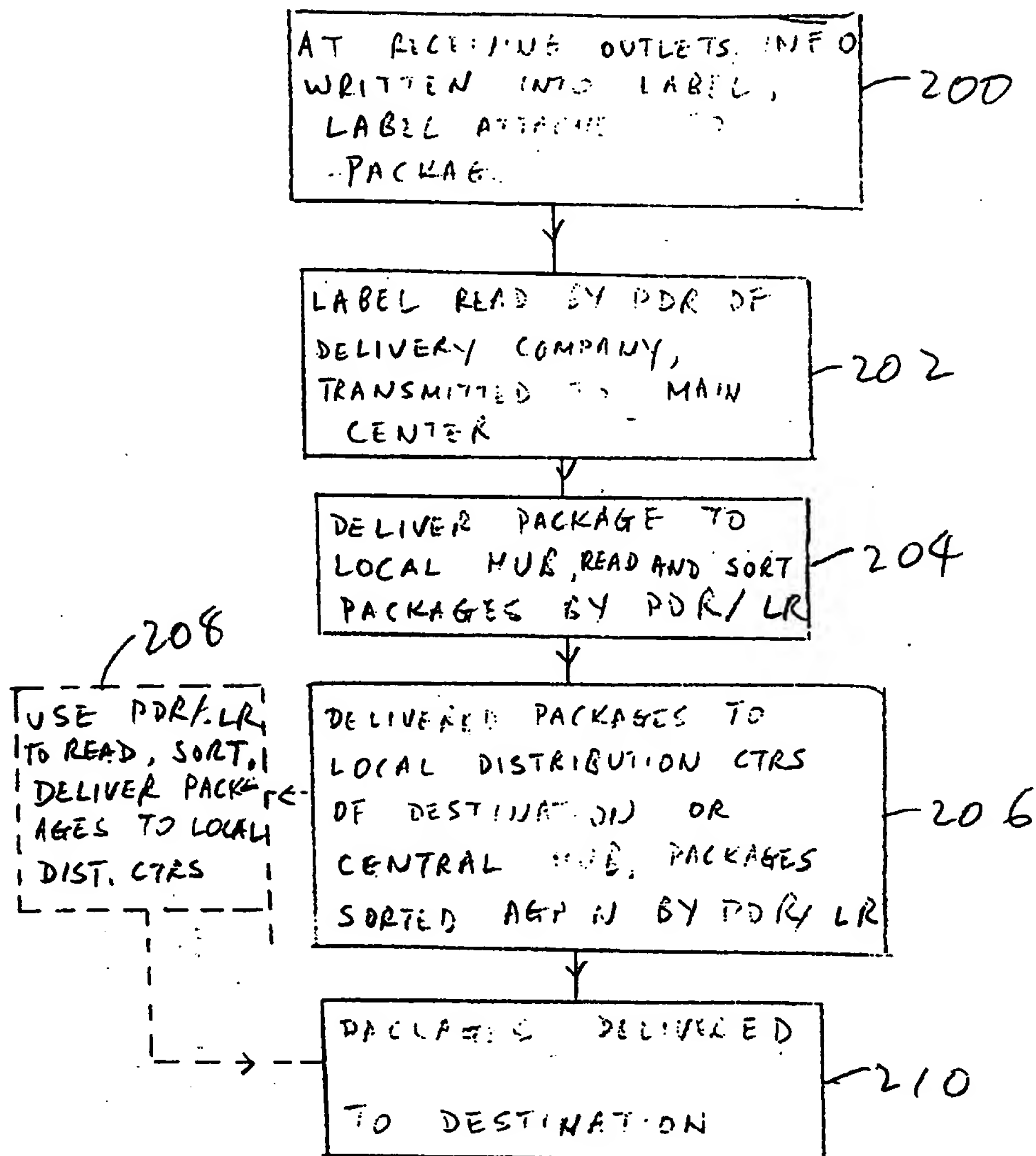
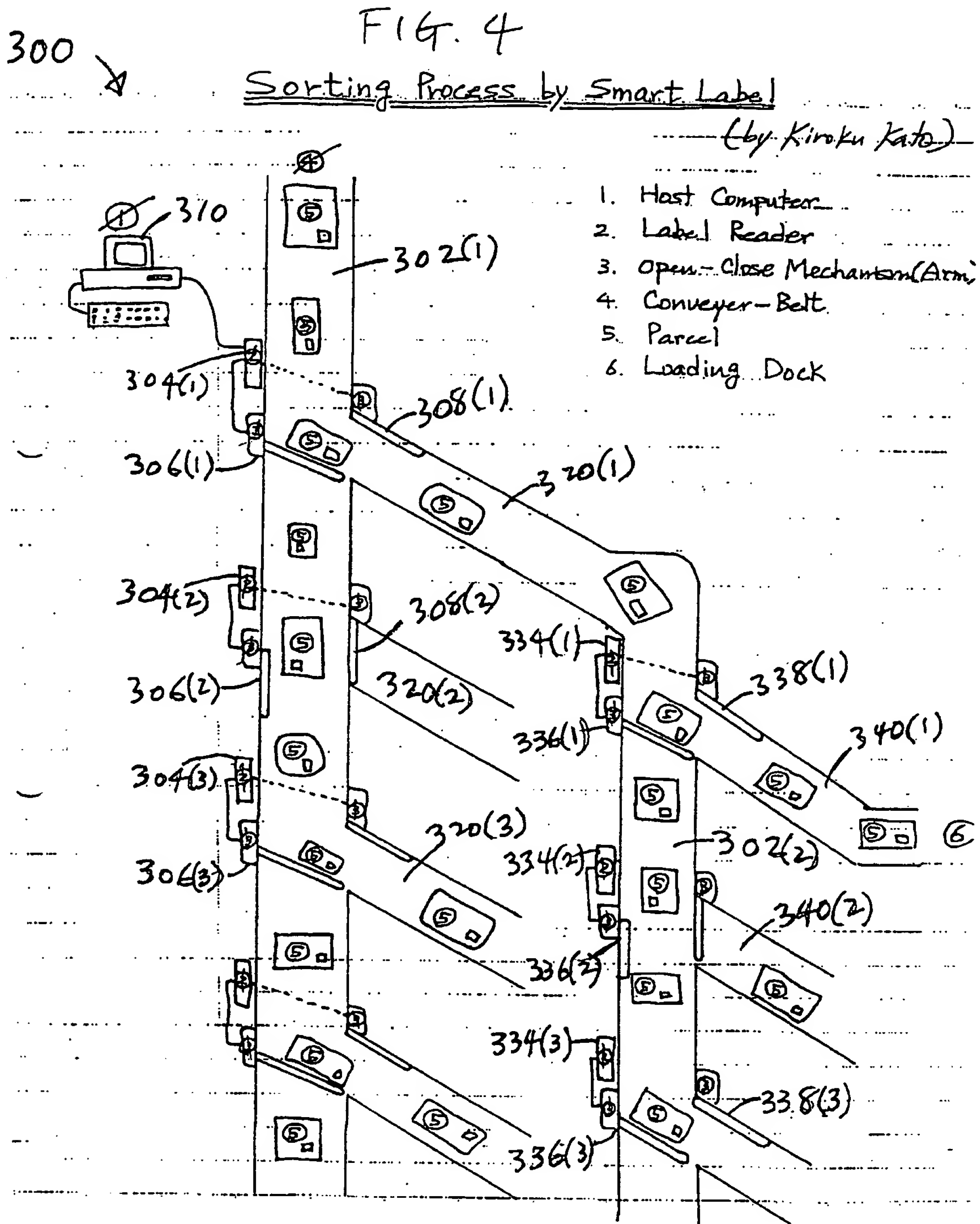


FIG. 3

4/4



INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/15574

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B07C3/12 B07C3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 40 02 738 A (LEIENDECKER) 1 August 1991 see the whole document ---	1-3, 7, 11, 12, 20
A	US 3 438 489 A (CAMBORNAC ET AL) 15 April 1969 see abstract ---	1-3, 7, 11, 12, 20
A	US 3 750 167 A (GEHMAN ET AL) 31 July 1973 see abstract ---	1-3, 8, 11, 12, 20
A	EP 0 697 261 A (NEOPOST) 21 February 1996 ---	
P, X	DE 196 16 130 A (SCHULZ ET AL) 16 October 1997 see the whole document -----	1-4, 7-15, 19, 20

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

28 October 1998

Date of mailing of the international search report

03/11/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Forlen, G

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. l. Application No

PCT/US 98/15574

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4002738 A	01-08-1991	NONE	
US 3438489 A	15-04-1969	BE 699837 A FR 1531508 A GB 1168509 A LU 53872 A NL 6708280 A	13-12-1967 14-11-1968 29-10-1969 22-04-1969 20-11-1968
US 3750167 A	31-07-1973	NONE	
EP 697261 A	21-02-1996	US 5684705 A	04-11-1997
DE 19616130 A	16-10-1997	NONE	